159.

THE SPEED MODULATION OF THE PATIENT'S ROTATION IN TSEI-RD TO IMPROVE THE HOMOGENEITY OF THE DOSE DISTRIBUTION IN THE HORIZONTAL PLANE. IN PHANTOM'S RESULTS

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Purpose: The aim of this study was to reduce the differences in doses accumulated in the points, localised in the same horizontal plane, on the patient's skin, during the rotary-dual total skin electron irradiation (TSEI RD).

Material and Method: During the standard TSEI RD technique, the patient was standing on the slowly and continuously rotating platform while the irradiation with two dual electron fields was performed. In this study a non-continuous platform movement was implemented. One cylindrical (diameter of 30 cm) and two elliptical (diameters of 20/40 cm and 25/35 cm) wax phantoms were used. The one full circle (360 degree) of the platform was divided into eight fractions. The platform speed was calculated individually for the each fraction. The total time of one rotation in both modes of the movements: continuous and non-continuous were equal. Phantoms were irradiated with two dual fields: size of 36x36 cm at the isocenter each, source-phantom distance of 300 cm, and with 6 MeV electrons' energy (output). Doses were measured with the semiconductor detectors which were placed equidistantly (distance between dosimetrical points by 45 degree) on the same horizontal plane on the phantom's surface.

Results: The respective measured doses after normalisation to those previously calculated were as follows: 1/ for the cylindrical phantom (diameter of 30 cm) - 100.1%, 99.8%, 100.3%, 99.4%, 100.1%, 99.8%, 100,3%, 99.4%; 2/ for the elliptical phantom of 25/35 cm – 98.3%, 99.6%, 103.2%, 99.2%, 97.8%, 99.6%, 103.2%, 100.7% and 3/ for the elliptical phantom of 20/40 cm – 95.8%, 99.9%, 105%, 98.8%, 95.8%, 100.2%, 105%, 99.3%. The modulation of the speed during platform's rotation resulted in the decrease of the dose discrepancies. The respective measured doses after the normalization performed with the same as above way were equal to: 1/ for the elliptical phantom of 25/35 cm – 99.4%, 99.9%, 101.3%, 100.5%, 100.1%, 100.9%, 101.1%, 99.7%; 2/ for the elliptical phantom of 20/40cm – 98.9%, 100.2%, 102.4%, 99.8%, 99%, 99.9%, 102.1%, 100.5%.

Conclusion: Results of the dose in-phantom measurements showed that the speed modulation of the platform reduced the dose inhomogeneity at the horizontal plane on the phantom's surface.

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TLD DOSIMETRY VERIFICATION OF DOSE OPTIMISATION METHOD USED IN ENDOVASCULAR BRACHYTHERAPY OF PERIPHERAL VESSELS

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Background: Multiple clinical trials had proven that endovascular brachytherapy can reduce the risk of restenosis from 30-60% to 5-15% if radiotherapy is planned and performed correctly. One of the most important parameter for the treatment planning is reference isodose length (RIL) defined as a vessel length at the reference depth (RD) covered by 90 % isodose. RIL depends on the source configuration – active source length (ASL), step times and reference depth. The reference isodose length must be greater or equal to planning target length (PTL) therefore the maximum intervention length (IL) must be smaller then RIL – 10 mm for safety margin.

Material and Method: The MicroSelectron HDR with Ir-192 source and the 5F catheter was used for treatment delivery. The dose distributions were calculated at